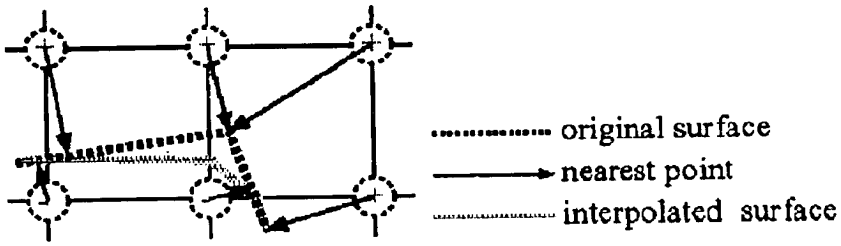
FIG.1



SURFACE RECONSTRUCTED BY
CODE DISTANCE FIELD AND LINEAR INTERPOLATION

FIG.2A

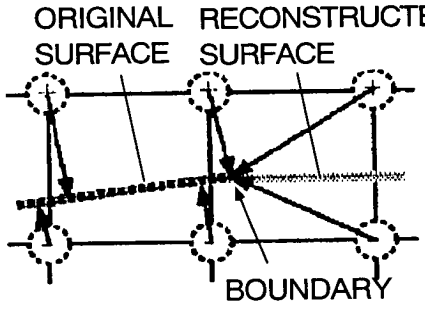
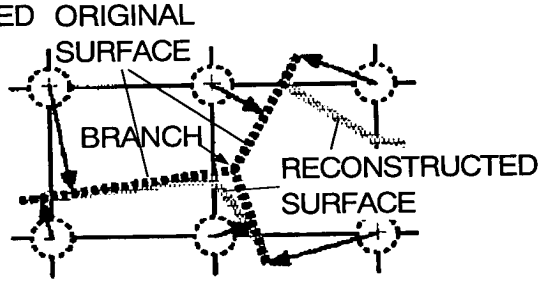


FIG.2B



NONMANIFOLD SHAPE RENDERED IN IMPLICIT FUNCTION
BY CONVENTIONAL METHOD

FIG.3A

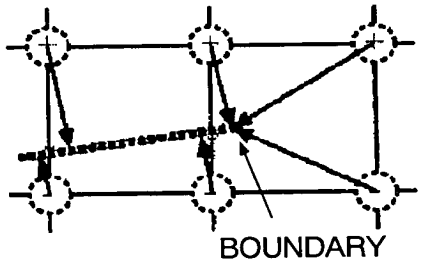
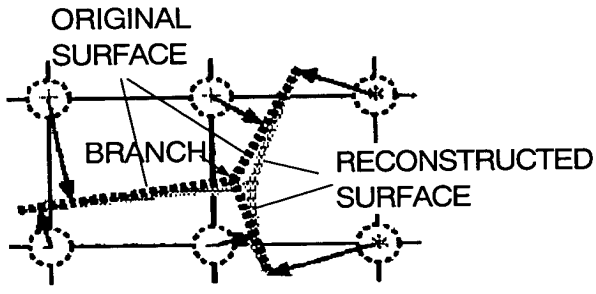


FIG.3B



NONMANIFOLD SHAPE RENDERED
IN IMPLICIT FUNCTION BY PRESENTED METHOD

FIG.4A

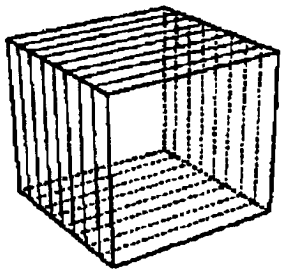


FIG.4B

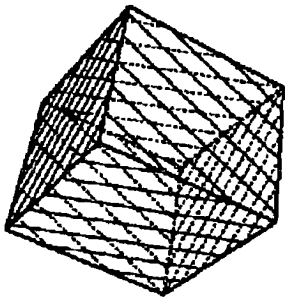


FIG.5A

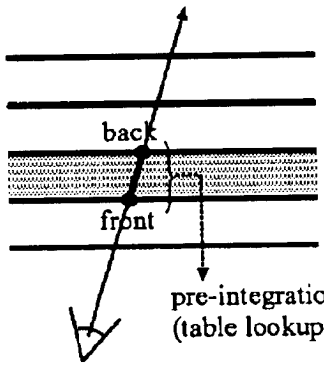
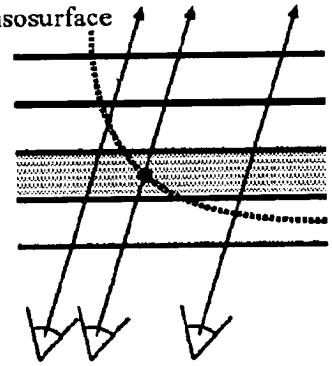


FIG.5B



DRAWING USING TEXTURES ON TWO ADJACENT SLICES

FIG.6A

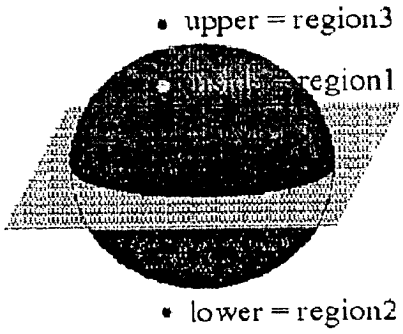


FIG.6B

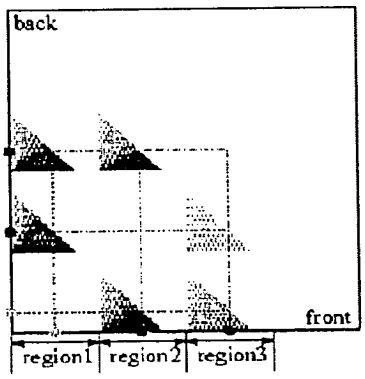


FIG.7A

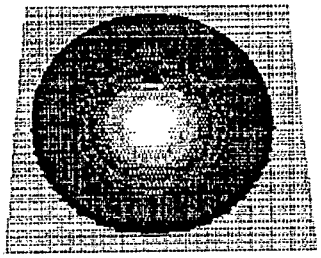


FIG.7B

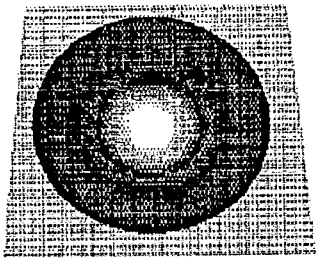


FIG.8A

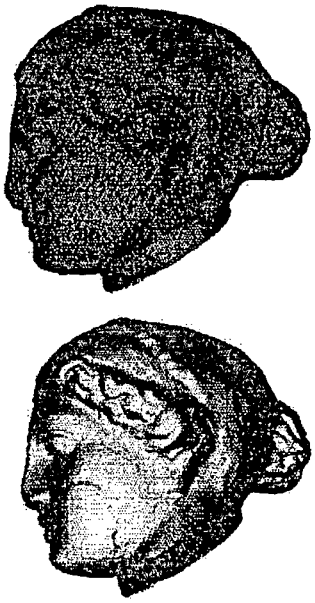


FIG.8B

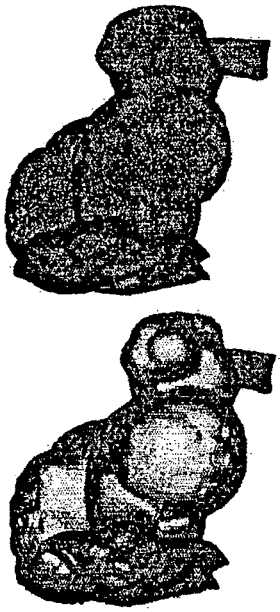


FIG.8C

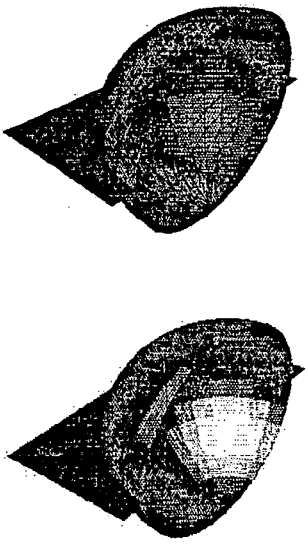


FIG.9

- CODE DISTANCE

$$f(p) = \pm d$$

  - d: Euclidean DISTANCE
  - t: FUNCTION VALUE ON SURFACE
  - $f>0$: SURFACE ● +
  - $f<0$: BACKSIDE ● −
- LINEAR INTERPOLATION

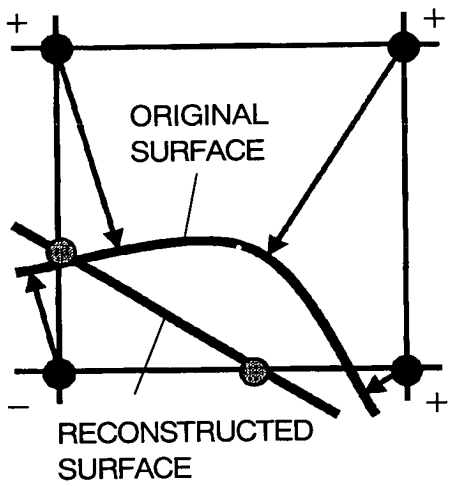
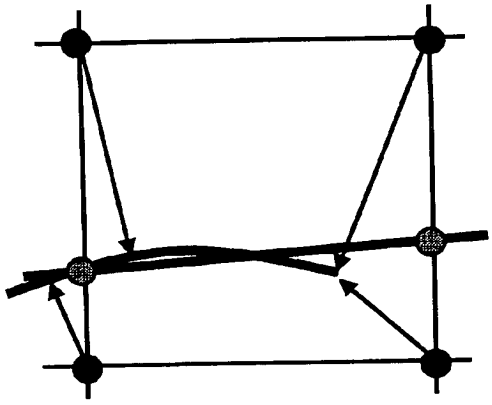
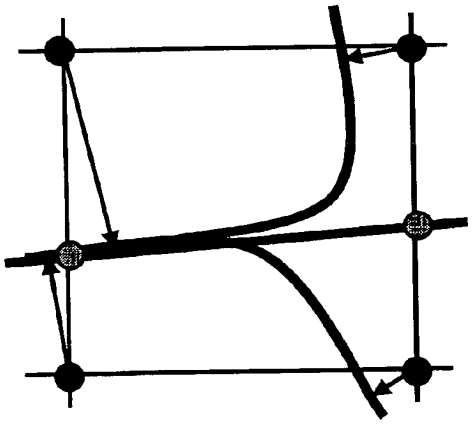


FIG.10A



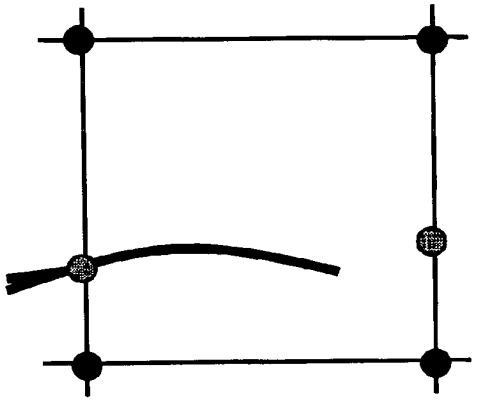
BOUNDARY ON SURFACE

FIG.10B

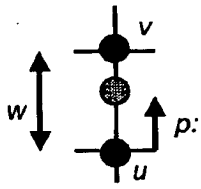


BRANCH ON SURFACE

FIG.11



BOUNDARY ON SURFACE



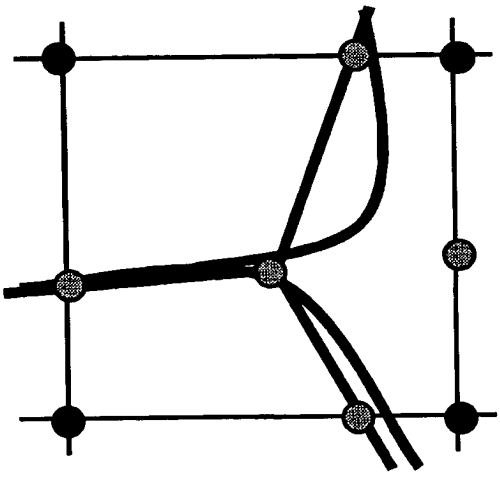
t: FUNCTION VALUE OF SURFACE

p: POSITION OF INTERPOLATION SURFACE

$$\begin{cases} 0 \in [u, v] \\ 0 < |u - v| \le w \end{cases}$$

$$p = (u - t)/(u - v)$$

FIG.12



BRANCH ON SURFACE

- $f>0$: SURFACE
- $f<0$: BACKSIDE

- $f \in R_i$
- $f \in R_j$
- $f \in R_k$

FIG.13

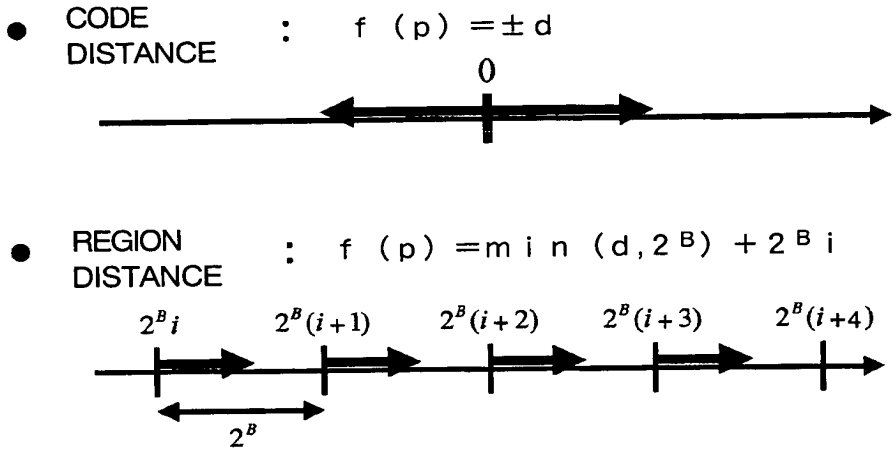

CODE DISTANCE : f (p) =± d
0
REGION DISTANCE : f (p) =min (d, 2 B) + 2 B i
2^B i
2^B (i+1)
2^B (i+2)
2^B (i+3)
2^B (i+4)
2^B

FIG.14

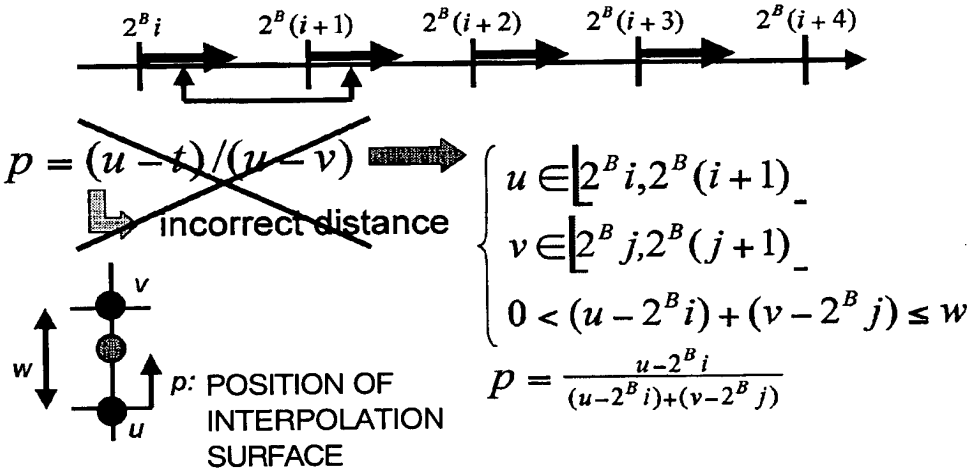
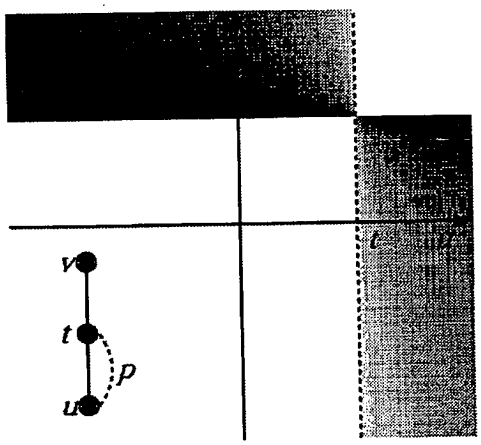
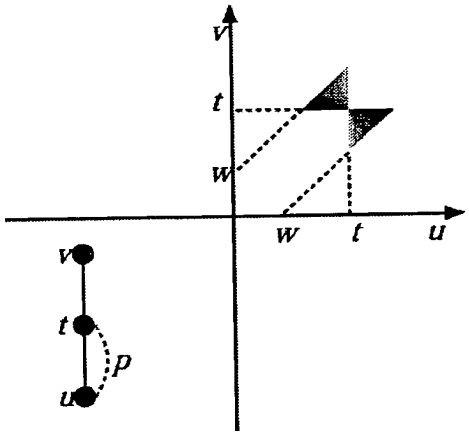

2^B i
2^B (i+1)
2^B (i+2)
2^B (i+3)
2^B (i+4)
p = (u − t)/(v − v)
incorrect distance
u ∈ [2^B i, 2^B (i+1))
v ∈ [2^B j, 2^B (j+1))
0 < (u − 2^B i) + (v − 2^B j) ≤ w
p = (u−2^B i) / ((u−2^B i)+(v−2^B j))
v
w
u
p: POSITION OF INTERPOLATION SURFACE

FIG.15A



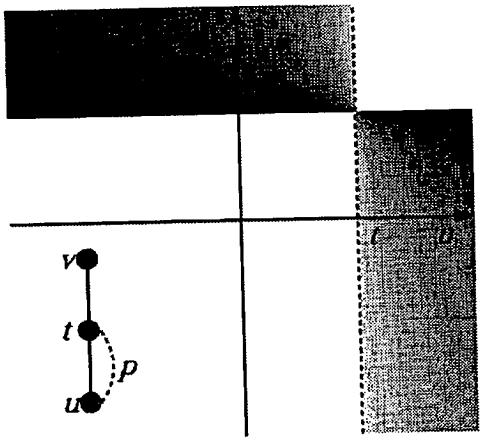
LINEAR INTERPOLATION

FIG.15B



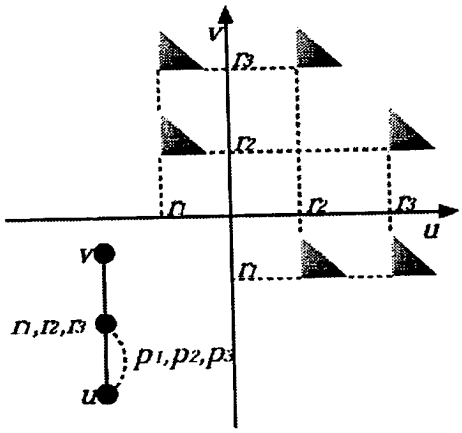
SURFACE WHERE THERE IS BOUNDARY

FIG.16A



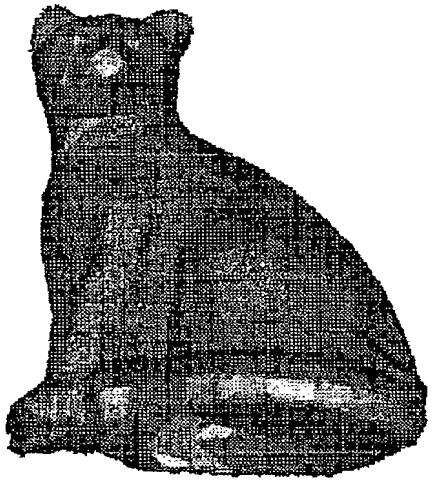
LINEAR INTERPOLATION

FIG.16B



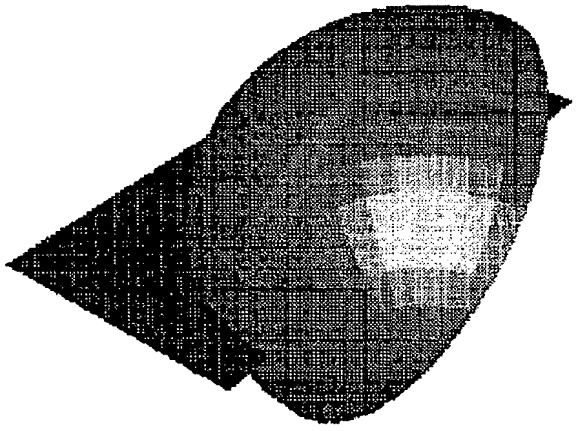
SURFACE WHERE THERE
ARE BRANCH AND BOUNDARY

FIG.17A



(volume=128^3)

FIG.17B



(volume=256^3)